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EXAMINER
BRAYTON, JOHN JOSEPH

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
07/02/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/502,052	FANTON ET AL.	
	Examiner	Art Unit	
	John Brayton	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-18,20,21 and 23-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-18,20,21 and 23-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims and Objections

1. Claims 1, 2, 5-18, 20, 21, 23-26 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 1, 2009 has been entered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 2, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao (US 4,107,019) in view of Iida (US 4,961,979).

Regarding claim 1, Applicant discloses the target is formed using an intimate blend of nickel oxide and nickel powders in order to form the target, the intimate blend would have a desired electrical resistivity (Applicant's disclosure pg. 5, ln. 24-29, pg. 6, ln. 30-38).

Takeo teaches a target comprising NiO_x capable of depositing film within a sputtering device (col. 8, ln. 25-30). Takao discloses blending nickel oxide powder and nickel powder to form a target. This blending would result in a target with a stoichiometric composition deficient in oxygen. The target would therefore inherently have a property of electrical resistivity of 10 ohm-cm or less.

Takao does not explicitly teach a target that is comprised predominantly of nickel oxide.

Iida is directed to an optical recording medium of oxygen deficient nickel oxide using a target of nickel oxide to sputter a nickel oxide layer. Iida teaches a target comprised predominantly of nickel oxide capable of depositing film within a sputtering device, and a layer comprising predominantly nickel oxide, wherein the nickel oxide is oxygen-deficient with respect to the stoichiometric composition (col. 6, ln. 48-57).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the target of Takao to provide a target comprising predominantly nickel oxide because it would allow one to deposit a layer comprising predominantly nickel oxide.

The Examiner takes the position that the language in claim 1, "an essentially ceramic target for a sputtering device" is an intended use and as such is not given patentable weight.

Regarding claim 2, Takao teaches a sputtering target wherein the stoichiometric deficiency stems from the composition of the intimate blend formed by nickel oxide powders and nickel powders (col. 8, ln. 25-30).

Regarding claims 23 and 24, as discussed above the resistance of the target would be an inherent property so long as the requirements of the structure of the target are met. MPEP 2112.01. Since Takao teaches the features as required by Applicant, properties of the target would be inherent. Therefore the target having an electrical resistivity of less than 1 ohm-cm or less than 0.1 ohm-cm are inherent to the target of Takao modified by Iida.

6. Claim 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Iida as applied to claim 1 above in view of Fujii et al (US 5,483,067).

Regarding claim 15, Takao and Iida teach sputtering targets but neither explicitly teach magnetron sputtering. The Examiner takes the position that sputtering a target with magnetic enhancement is well known.

Fujii teaches a process for manufacturing a thin layer of nickel oxide using magnetically enhanced sputtering (col. 23, ln. 10).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Iida by providing a process for manufacturing a

thin layer of nickel oxide using magnetically enhanced sputtering, as taught by Fujii, because it would concentrate the plasma over the target.

7. Claims 5, 6, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Iida as applied to claim 1 above, in view of Arai et al (US 5,981,092 as cited in IDS).

Regarding claims 5 and 6, neither Takao nor Iida explicitly teach a minority element alloyed to nickel oxide.

Arai teaches a composite target (col. 3, ln. 66) comprised of predominantly of NiO (col. 4, ln. 38) with a minority element less than 50 atomic % (col. 4, ln. 43-67).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Iida, wherein nickel oxide is alloyed with a minority element less than 50 atomic %, as taught by Arai, because it would lower the resistivity and increase the quality of the film (col. 4, ln. 47-50).

Regarding claims 25 and 26, Takao does not explicitly teach the atomic percentage of the minority element is less than 30% or less than 20% calculated with respect to the nickel.

Arai teaches a sputtering target of NiO having a minority element of Boron with a volume percent of 8% compared to Nickel Oxide (col. 13, ln. 47-50). The Examiner takes the position that Arai teaches the atomic percentage of the minority element is less than 30%, or less than 20% calculated with respect to the nickel.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Iida by providing the atomic

percentage of the minority element is less than 30% or less than 20% calculated with respect to the nickel, because it would lower the resistivity (col. 4, ln. 45-50).

8. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao, Iida and Arai as applied to claim 5 above in view of Campet et al. (US 5,522,976).

Regarding claim 7 and 8, neither Takao, Iida nor Arai explicitly teach a minority element whose oxide is an electroactive material with anodic coloration. Nor does it teach minority elements of Co, Ir, Ru, or Rh. Takao as modified by Arai teaches a nickel oxide target alloyed with a minority element.

Campet is directed to a target for cathode sputtering. It teaches a target compound of NiO alloyed with a minority element from the metals of groups I-VIII of the Periodic table, these groups include minority elements consisting of Co, Ir, Ru, or Rh (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Arai by alloying with a minority element from the group of Co, Ir, Ru, or Rh, as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Applicant discloses minority elements whose oxide is an electroactive material with anodic coloration, such as for example Co, Ir, Ru, and Rh or from those belonging to column one of the Periodic table (for example H, Li, K and Na). (Applicant's disclosure pg. 6, ln. 11-18). Since Campet teaches a minority element from the group

of Co, Ir, Ru, or Rh, the Examiner takes the position that an oxide of one of these minority elements is inherently an electroactive material of anodic coloration.

Regarding claims 9 and 10, neither Takao, Iida, nor Arai teach minority elements whose oxide is an electroactive material with cathodic coloration. Nor do they teach minority elements of Mo, W, Re, Sn, In, Bi, or mixtures thereof.

Campet is directed to target for cathode sputtering. It teaches a target compound of NiO alloyed with a minority element from the metals of groups I-VIII of the Periodic table, these groups include minority elements consisting of Mo, W, Re, Sn, In, Bi (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Iida, and Arai by alloying with a minority element from the group of Mo, W, Re, Sn, In, Bi as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Applicant discloses “minority elements whose oxide is an electroactive material with cathodic coloration, chosen from the group of Mo, W, Re, Sn, In, Bi” (Applicant’s disclosure pg. 6, ln. 19-24). Campet teaches a minority element from the group of Mo, W, Re, Sn, In, Bi, the Examiner takes the position that an oxide of one of these minority elements is inherently an electroactive material of cathodic coloration.

Regarding claims 11 and 12, neither Takao, Iida, nor Arai teach minority elements selected from the elements belonging to column one of the periodic table.

Campet is directed to a target for cathode sputtering. It teaches a target compound of NiO alloyed with a minority element from the metals of group I of the Periodic table. Group I includes minority elements of H, Li, K and Na (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Iida and Arai by alloying with a minority element from Group I of the Periodic table, as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Regarding claims 13 and 14, neither Takao, Iida, nor Arai teach minority elements selected from the elements belonging to column one of the periodic table.

Campet is directed to a target for cathode sputtering. It teaches a target compound of Ni alloyed with a minority element that is a metal or an alkaline earth or a semiconductor. Campet also teaches a minority element selected from the group consisting of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, or Y (col. 2, ln. 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Iida and Arai by alloying with a minority element from the group consisting of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, or Y (col. 2, ln. 30-36), as taught by Campet, because it would allow these solid materials having the desired properties to be sputtered and form a high melting point target compound (col. 1, ln. 24-30).

Applicant discloses a minority element selected from the group consisting of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, Y is a metal or an alkaline earth or a

semiconductor, wherein the hydrated or hydroxylated oxide of which is protonically conductive (Applicant's disclosure pg. 6, ln. 25-30). Since Campet teaches a minority element from the group of Ta, Zn, Zr, Al, Si, Sb, U, Be, Mg, Ca, V, or Y the Examiner takes the position that the hydrated or hydroxylated oxide of one of these minority elements would be protonically conductive.

9. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takao, Iida, and Fujii as applied to claim 15 above, in view of Hashimoto et al (US 5,831,760).

Regarding claim 16, Takao and Iida teach a nickel oxide layer formed by sputtering a nickel oxide target. Nickel oxide is an electrochromic material that exhibits anodic coloration. Neither Takeo, Iida, or Fujii explicitly teach an oxidative colored electrochromic material comprised of nickel oxide.

Hashimoto teaches an oxidative colored electrochromic layer comprised of nickel oxide (col. 4, ln. 37-49).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Takao, Iida and Fujii by producing an electrochromic material having an anodic coloration as a thin layer based on nickel oxide, because it would provide a layer with good optical properties and repeated durability (col. 4, ln. 42-45 of Hashimoto).

Regarding claim 17, Takao and Iida teach a nickel oxide layer formed by sputtering a nickel oxide target. Neither Takao, Iida, nor Fujii explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

Hashimoto teaches an electrochemical device comprising a substrate provided with a stack of functional layers (Figures 1-6, Abstract of Hashimoto), including a layer based on nickel oxide (col. ln. 37-49).

The Examiner takes the position that the recitation "capable of" performs a function and is not a positive limitation but only requires the ability to so perform. Therefore the language "capable of reversibly and simultaneously inserting ions of the H+, Li+, or OH- type and electrons" is not given patentable weight.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Iida and Fujii to provide an electrochemical device comprising a substrate provided with a stack of functional layers including a layer based on nickel oxide, as taught by Hashimoto, because it would provide a layer with good optical properties and repeated durability (col. 4, ln. 42-45 of Hashimoto).

Regarding claim 18, Takao and Iida teach a nickel oxide layer formed by sputtering a nickel oxide target. Takao, Iida, nor Fujii do not explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

Hashimoto teaches an electrochemical device comprising a substrate provided with a stack of functional layers (Figures 1-6, Abstract of Hashimoto), including a layer based on nickel oxide, said layer being alloyed with a minority element consisting of a material whose oxide is an electroactive material with anodic coloration (col. ln. 37-49).

The Examiner takes the position that the recitation "capable of" performs a function and is not a positive limitation but only requires the ability to so perform.

Therefore the language "capable of reversibly and simultaneously inserting ions of the H+, Li+, or OH- type and electrons" is not given patentable weight.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao, Iida, and Fujii by providing an electrochemical device comprising a substrate provided with a stack of functional layers, including a layer based on nickel oxide, said layer being alloyed with a minority element consisting of a material whose oxide is an electroactive material with anodic coloration, as taught by Hashimoto, because it would provide a layer with good optical properties and repeated durability (col. 4, ln. 42-45 of Hashimoto)

The properties of the layer being an electrochemically active layer with a minority element consisting of a material whose oxide is an electroactive material with anodic coloration are inherent to a nickel oxide layer with a minority element consisting of Co, Ir Ru or Rh, as disclosed by Applicant on page 6, ln. 11-18.

10. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Iida as applied to claim 1 above, in view of IBM Technical Disclosure: Thermally Stable Thin Film Capacitor, February 1967.

Regarding claim 20, Takao and Iida teach a nickel oxide layer formed by sputtering a nickel oxide target. Takao and Iida do not explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

The IBM Tech. Disclosure teaches an electrochemical device comprising at least one carrier substrate provided with a stack of functional layers, including at least one electrochemically active layer, capable of reversibly and simultaneously inserting ions,

of the H.sup.+, Li.sup.+ or OH.sup.- type, and electrons, wherein said electrochemically active layer is based on nickel oxide, said layer being alloyed with a minority element selected from the elements belonging to the column one of the Periodic Table, said layer being obtained from a sputtering target.

The Examiner takes the position that the recitation "capable of" performs a function and is not a positive limitation but only requires the ability to so perform. Therefore the language "capable of reversibly and simultaneously inserting ions of the H+, Li+, or OH- type and electrons" is not given patentable weight.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Iida by providing an electrochemical device with a stack of functional layers including at least on electrochemically active layer based on nickel oxide alloyed with a minority element selected from column one of the Periodic Table, because it would produce a device with a high capacitance per unit area and maintain stability during and after exposure to high temperature environments (IBM Tech. Disclosure pg. 1).

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takao and Iida as applied to claim 1 above in view of Van Der Sluis (US 5,905,590).

Regarding claim 21, Takao and Iida teach a nickel oxide layer formed by sputtering a nickel oxide target. Neither Takao nor Iida explicitly teach an electrochemical device comprising a substrate provided with a stack of functional layers.

Van Der Sluis teaches an electrochemical device comprising at least one carrier substrate (figure 1, 3) provided with a stack of functional layers (Figure 1; reference

numbers 5, 7, 9, 11, 13) including at least one electrochemically active layer (col. 4, ln 4-30), capable of reversibly and simultaneously inserting ions, of the H.sup.+, Li.sup.+ or OH.sup.- type, and electrons, wherein said electrochemically active layer is a metal or an alkaline earth or a semiconductor, the hydrated or hydroxylated oxide of which is protonically conducted by sputtering (col. 4, ln. 25-26).

Since Van Der Sluis teaches a layer of a metal or an alkaline earth or a semiconductor, the properties of this layer wherein the hydrated or hydroxlyated oxide of the layer would be capable of protonically conducting are inherent. Therefore the hydrated or hydroxlyated oxide of the layer taught by Van Der Sluis would be capable of protonically conducting.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takao and Iida with an electrochemical device comprising at least one carrier substrate provided with a stack of functional layers, including at least one electrochemically active layer, capable of reversibly and simultaneously inserting ions, of the H.sup.+, Li.sup.+ or OH.sup.- type, and electrons, wherein said electrochemically active layer is a metal or an alkaline earth or a semiconductor, the hydrated or hydroxylated oxide of which is protonically conducted, as taught by Van Der Sluis, because it would allow use of solid state electrolytes therefore eliminating sealing problems and making the device easier to handle (col. 4, ln. 4-6).

Response to Arguments

12. Applicant's arguments filed May 1, 2009 have been fully considered.

In the reply the Applicant's argue that the amendment… "the target is capable of depositing film within a sputtering device" further limits the claim by requiring the elements of the claim perform the functions for which they are defined.

The Examiner is of the position that the recitation that an element is capable of performing a function is not a positive limitation but only requires the ability to so perform. *In re Hutchison*, 69 USPQ 138. An apparatus meeting the recited structural elements of claim 1 would be capable of performing the function, depositing film within a sputtering device. For example, a wafer having a coating could be placed in a sputtering device and sputtered using a sputtering gas to remove material from said wafer. The material removed would deposit film within the sputtering device. Therefore such a wafer meeting Applicant's structural requirements would be capable of performing the function.

The Examiner feels the body of claims only further define the target, a block of material recited in claim 1 capable of being sputtered, and not a sputtering device. Nevertheless, the Examiner takes the Applicant's reply filed May 1, 2009 as an admission that the invention as claimed is only directed for use in a sputtering device.

However, both Takao and Iida teach sputtering targets comprising nickel oxide used in the sputtering process for forming layers on a substrate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Brayton whose telephone number is (571)270-3084. The examiner can normally be reached on 7:30 a.m. - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

/J. B./
Examiner, Art Unit 1795

June 23, 2009